Inventory and evaluation of Nairobi Animal Orphanage

- *Focusing on Congo Grey African parrot, cheetah and rehabilitation*

Inventering och utvärdering av Nairobi Animal Orphanage – med fokus på grå jako, gepard och rehabilitering

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Summary

This BSc thesis is a part of an initial step of a collaboration between Skansen and Kenyan Wildlife Service (KWS) and constitutes of an inventory of the Nairobi Animal Orphanage run by KWS. Animal Orphanage takes care of orphaned and injured animals arriving from throughout Kenya. The project started out as a refuge and as a temporary place for animals in need of care and help. With time it has evolved to an establishment that resembles and functions more like an animal zoo. The aim of this inventory is to focus on how the biological needs of Congo grey parrots (*Psittacus erithacus erithacus*) and cheetahs (*Acinonyx jubatus*) are met, in terms of management and housing. It will further deal with rehabilitation of animals that are to be released back into their natural habitat, as rehabilitation and releasing are a part of AO:s aim. The inventory was carried out during three weeks at the AO in Nairobi. Enclosures were measured, sketched, photographed, and information about animals as well as management was obtained through interviews with the staff, information-boards and an animal record. The results revealed an establishment with a desire to help animals and to provide them with a good welfare, but lacking funds and know-how to do so. Enclosures and handling of the specific species, but also other species at the AO, demands for large as well as small improvements, regarding animal welfare. The aim of releasing animals back in to their natural habitat was far from reached, as this was rarely carried out. Knowledge and funds were insufficient also in this matter. The result of an unlimited intake of animals and no advance planning, such as a functional release programme, has instead resulted in a congested facility with poor animal welfare. Establishing a release programme would require a completely different approach to the animals and their handling but also a new way of thinking. In conclusion, the collaborations with Skansen and other organisations will come to play a crucial role for a future improved and reformed AO.

Sammanfattning

Detta examensarbete är en del av ett nyetablerat samarbete mellan Skansen och Kenyan Wildlife Service (KWS). Det består av en inventering av Nairobi Animal Orphanage (AO) som drivs av KWS. Animal Orphanage tar hand om övergivna och skadade djur från runt om i Kenya. Projektet påbörjades som en temporär uppehållsplats för djur i behov av vård och hjälp. Med tiden har det istället utvecklats till en etablering som snarare påminner om en djurpark. Inventeringens syfte är att fokusera på inhysning och hantering av grå jakos (*Psittacus erithacus erithacus*) och geparder (*Acinonyx jubatus*), för att sedan bedöma hur väl dessa arters biologiska behov tillgodoses. Då ett av AO mål är att rehabilitera och frisläppa djuren kommer examensarbetet vidare även att behandla dessa två områden. Inventeringen pågick under tre veckor på AO i Nairobi. Hägn mättes, ritades av, fotograferades, och information om djur och hantering erhölls via intervjuer med personal, informationsskyltar och genom ett djurprotokoll. Resultaten visar ett projekt med en önskan om att hjälpa djuren och förse dem med en bra välfärd, men saknar kapital och relevant kunskap för att kunna fullfölja detta. Hägn och hantering hos de utvalda arterna, såväl som andra arter på AO, kräver stora som små förbättringar beträffande djurvälfärden. Målet om att släppa tillbaka djuren till deras naturliga habitat är långt ifrån nått, då detta mycket sällan genomförs. Kunskap och kapital är även i detta avseende det avgörande problemet. Resultatet av ett obegränsat intag av djur, utan planering för framtiden, såsom ett fungerande rehabiliteringsprogram, har istället resulterat i en överfull anläggning. Att etablera ett rehabiliterings- och frisläppningsprogram kommer att kräva ett helt nytt förhållningssätt till djuren och dess hantering men även nytt tänkande gällande hela projektet. Avslutningsvis, samarbetet mellan Skansen och andra organisationer kommer att spela en avgörande roll i ett framtida förbättrat och förändrat AO.

1. Introduction

1.1. Background

1.1.1. Kenya Wildlife Service, Skansen and Nairobi Animal Orphanage

This project was issued by the Swedish zoo Skansen which has initiated a collaboration with Kenya Wildlife Service (KWS).

The KWS is a state co-operation which is similar in its operating range, to the Swedish Environmental Protection Agency. It is an organisation within nature and wildlife management and one of their goals is to offer information and education in order to enhance the understanding of Kenyan wildlife. Their interest is to continuously develop and improve their work in these areas. Knowledge regarding the handling and husbandry of wild animals in captivity is limited which is why the KWS contacted Skansen with the aim to exchange experiences and resources.

The foundation of Skansen was established in 1891 and is an open air museum and zoo located in Stockholm. One of their aim is to contribute to the protection and conservation of biodiversity with emphasis on the Scandinavian flora and fauna. Skansen promotes public education as a basic element of their goals.

The Animal Orphanage (AO) is a long running facility located on the outskirts of Nairobi at the KWS headquarters. The AO was established in 1964 and was originally a refuge for wild animals that were found orphaned, abandoned or injured through out Kenya, both in protected and non protected areas. The exhibit grew in an unplanned way, as well as the number of animals displayed in the facility. Animals are kept for treatment, rehabilitation and on rare occasions they are released back to nature. Most of the animals remain for the rest of their lives at the Orphanage for educational purposes. The current objectives of the Orphanage according to the KWS are:

- To give care and sanctuary to animals that have been abandoned or lost their mothers either through poaching, predation or natural causes.
- To promote public interest towards wild animals by exhibiting the variety of species domestic in Kenya.
- To promote education of Kenya wildlife and research.
- To rehabilitate and when possible reintroduce animals into the national parks.

This BSc thesis is the introductory step to establish the co-operation between Skansen and KWS, and constitutes an inventory of the AO. The inventory was conducted by me and two other students; Ellen Hedman and Marion Lindmark, at the KWS. In each BSc thesis, parts of the inventory will be specified and suggestions for improvements will be presented in the discussion. Three themes are also elucidated, one in each thesis. The two other theses concern:

- Black-Backed Jackal (*Canis mesomelas*), Lion (*Panthera leo*), Patas Monkey (*Erythrocebus patas*) as well as routines and feeding at Animal Orphanage.
- Spotted hyena (*Crocuta crocuta*), Serval (*Felis serval*), Sykes Monkey (*Cercopithecus albogularis*), Vervet Monkey (*Chlorocebus aethiops*) and the education at Animal Orphanage.

This thesis comprehends the inventory of African Grey parrots, cheetahs as well as the handling and management of orphans. It also addresses the matter of releasing wild captive reared animals back into nature (see purpose: page 8).

1.2. Animal species

1.2.1. Congo Grey African parrot (Psittacus erithacus erithacus)

Grey parrots primarily inhabit lowland tropical forests and mangroves (Wright, 2001) and live as most other parrots in large flocks (Luesher, 2006). The flock size may range from several hundreds to thousands of birds (Wright, 2001). Congo Greys are single species flock birds i.e birds that only associate and flock with their own species (Wright, 2001). Living in a flock is of great importance as it increase their chances of survival (Luesher, 2006). The groups often roost in high tree tops, ordinarily situated nearby water or on islands on rivers (Wright, 2001).

Figure 1. Congo Grey African parrot. (Photo: Diana Sommer)

Congo Greys spend most of the day with relatively quite and calm activities such as sleeping, resting and grooming (Luesher, 2006). During the day they may travel long distances to forage in different fruit trees, but also on different ground locations (Wright, 2001). Around 40 minutes a day are spent foraging on the ground (Wright, 2001). They feed on flowers, fruits, seeds, stems, leaves, roots and soil (Wright, 2001). Grooming activities also occupy a large amount of the day (Luesher, 2006). Grooming occurs when the birds are comfortable and relaxed, but the behaviours themselves also appear to be comforting and soothing to the birds (Luesher, 2006). Preening is, however, also performed to keep the plumage in good condition which is crucial for flight, thermoregulation, waterproofing, camouflage and communication (Luesher, 2006). Besides self-directed grooming, parrots also engage in allogrooming. This behaviour allows inaccessible areas to be groomed but is foremost an important social behaviour (Luesher, 2006).

Grey parrots are intelligent animals and exhibit comparable communicative and cognitive abilities with marine animals, apes and in some areas five to six year old humans (Pepperperg, 2006). Results from studies of Grey parrots conducted by Dr. Pepperberg (2006) has shown that Congo greys have capabilities such as to label over 50 objects, to declare if they want something or want to go somewhere, to separate colours, to distinguish between quantities and so forth. Grey parrots are also known for their amazing ability to mimic human language (Pepperberg, 2006). For their intelligence and ability of mimic they are, as many other parrots, taken from their natural habitat and sold illegally to become pets. Grey parrots are today classified as near threatened by the IUCN and are expected to decline on account of illegal trading and habitat loss (IUCN, 2009).

1.2.2. Cheetah (Acinonyx jubatus)

Cheetahs are mostly diurnal and live either alone or in groups of males or mothers with cubs, (Estes, 1991; Krausman & Morales, 2005; Durant et al., 2007) adult females live solitary (Estes, 1991).

They have a ranging system that forces them to constantly be on the move to avoid predators but yet be close to their prey (Durant et al., 2007). Consequently they exist in lower densities than other predators and require large areas of connected habitat (Durant et al., 2007). Habitat size may vary depending on factors like the structure of the territory and the availability of prey (Broomhall et al., 2003). Cheetahs may cover very large areas if the prey is migrating, and they can range up to 1000 km^2 (Estes, 1991). Lion and hyenas are cheetahs main competitors, as they steal their kills and also are a great threat to cheetah cubs (Durant, 2000). Cheetahs have problems defending themselves against these; their jaws are small and they have a light body (Durant, 2000). Cheetahs

coexist with lions and hyenas by actively avoid them, by moving away or by reducing hunting when these predators are close (Durant, 2000).

Cheetahs are foremost considered as savannah living animals but in addition to being great hunters in the open plains they also survive well in woodlands (Eaton, 1970; Mills et al., 2004). They do however seem to prefer open territory for hunting (Broomhall et al., 2003) and they are as well more successful with their hunting in this type of habitat (Mills et al., 2004). It is believed that trees and shrubs become obstacles for the cheetahs' fast hunting tactic, but it can also be an advantage and function as cover while hiding or stalking prey (Mills et al., 2004). Cheetahs hunt mainly in the morning or in the early afternoon (Caro, 1994). Their hunting success depends on factors such as; occurrence of cubs, prevalence of prey and of competitive predators (Mills et al., 2004), habitat, prey species, herd size, sex and age of the prey and previous hunting experience (Eaton, 1970).

Figure 2. Female cheetah in Masai Mara.

Cheetahs are capable of killing different kind of animals, from 2 kg animals such as hares and young warthogs up to large preys like wildebeest (Eaton, 1970). However they prefer abundant medium- sized preys ranging from 23 to 56 kg, for example impalas, springbok or Thomson and Grants gazelle (Mills et al., 2004; Hayward et al., 2006). Male coalitions kill larger preys than females with cubs, which mostly kill smaller or medium sized preys (Bissett & Benard, 2007).

Cubs are taught how to hunt by their mother. Already at an age of five to six weeks they begin to follow her around except for when she is chasing prey. Before they become independent they start practising to pursue and kill prey (Estes, 1991). The mother brings dead prey to the cubs, and at an older age she starts bringing them live young prey for them to practice to kill, and finally she allows them to follow her on hunts (Box & Gibson, 1999). When they are between nine and ten months old they may manage to capture a hare or a young gazelle on their own but might still have problems killing it (Estes, 1991). The cheetahs are around 17-23 months old when they leave their mother (Estes, 1991). The litter mates stay together for some time after the separation with the mother (Caro, 1994).

Figure 3. Cheetah cub in Masai Mara. (Photo: Diana Sommer)

The IUCN has classified the cheetah as vulnerable (IUCN, 2009), it is extinct in many areas of the world and is today only widely but sparsely distributed in some parts of Africa (Estes 1991; Krausman & Morales, 2005). Fragmentation and habitat loss are believed to be the primary threats, but conflicts with humans are also a major threat to cheetahs (IUCN, 2009).

1.2.3. Wild animals in captivity – general

During the evolution, animals have adapted to environments and conditions in nature and a life in captivity is drastically different from a life in the wild. To keep an animal in confinement consequently leads to welfare- as well as ethical issues. Stress is a common problem in animals kept in a more or less artificial environment. Restricted movement, reduced space to retreat, presence of humans and reduced feeding opportunities are a few examples of stressors for the animals (Morgan

& Tromborg, 2007). These factors should be considered while designing enclosures and planning the management of these animals in order to create the best possible welfare.

1.3. Release of captive reared animals

Today, zoological institutes play an important role in species conservation (Caro, 1999) and reintroduction could be one method of conservation to help save species from extinction (Tear et al., 1993). To release animals to the wild is however not an easy task, especially not if the animal has been reared in captivity (Tutin et al., 2001). The risks when releasing captive animals are many. The main concern is that animals in captivity often have lost some of their natural behaviours such as foraging and hunting, social interactions, breeding, and they might have deficiencies in the locomotor system (Box, 1991; Snyder et al., 1996; Rabin, 2003) and also diminished ability to recognise and escape from predators (Caro, 1999). They may further lack the appropriate immune defence for the environment in the wild, which might make them more vulnerable to pathogens (Jule et al., 2008). They can on the other hand be a liability and spread pathogens unfamiliar to the wild populations (Kleiman, 1989).

Animals that are bred in captivity have a smaller chance of being successfully released compared to animals reared in the wild (Frantzen et al., 2001). The importance of maintaining the natural behaviours of the species, exposing the animals to complex environments and providing training for particular skills are hence crucial for the animal that are to be released in order to survive (Griffin et al., 2000; Wallace, 2000). They require sufficient foraging behaviour as well as anti-predator and social behaviour skills (McDougall et al., 2006). If the animals are tolerant to a broad range of habitats, adaptable to new situations, able to feed on a wide range of food and are inclined to explore its environment, it may effect and facilitate the release of the animal (Sinclair , 1995).

There are two ways to release animals back into nature; a hard release and a soft release. A hard release is without any period of acclimatisation or waiting period at the site of release. In a soft release the animals will for example be held in enclosures at the release site to become acclimated to the new environmental conditions (Moore & Smith, 1991; Wallace, 2000). Relatively long acclimatisation and soft releases should be preferred (Moore & Smith, 1991).

Reintroduction programmes should have long-term post-release monitoring and documentation, to assess the outcome of the release and to be able to learn and improve present and future reintroduction procedures (Moore & Smith, 1991; Wallace, 2000).

1.4. Purpose

The purpose of this Bsc thesis is to:

- find out and present how the enclosures and management of Congo Grey African parrots and cheetahs are and function at the Animal Orphanage.
- evaluate how the chosen species' biological needs are met within the current housing and propose improvements based on the inventory.
- inventory the nursery and management of the orphaned animals, and from a conservation point of view discuss possible release aspects of animals.

2. Method

2.1. Inventory

The practical part of the inventory was conducted at the AO in Nairobi during three weeks from the 16th of March to the 3rd of April 2009. The original idea of the BSc thesis was primarily simply to inventory and to evaluate animal enclosures with the aim to suggest improvements. However, already early in the process of the inventory, it was obvious that the improvements were needed on a higher level as well. Animal enclosures were inventoried and information regarding the individual animals, their feed and routines were collected according to plan. After the completed inventory, the enclosures and species in most the need of development were selected for a more thorough review as well as the handling of orphans and the utilisation of implementing releases of animals back to nature. Since this project is a co-operation with two other students, parts of the background and methodology have been written together.

2.2. Enclosures and animals

The enclosures were measured, photographed and documented in writing. A sketch was also drawn by hand over the enclosure.

All lengths, heights and widths of the enclosures were measured with a measuring tape and recorded in centimetres. Doors, openings, roofs and interiors such as small houses and platforms were measured when possible. If not, those measurements were estimated when needed. Distance between enclosure fence and security barrier as well as distance to neighbouring enclosures were measured. Photos of the enclosures were taken, including the belonging information board and an overview of the enclosure. Each side of the enclosure was photographed as well as the interior and the individual animals when possible. The sketch over the enclosure included the different measurements, shape of fencing and interior, location of trees, bushes and water facilities. Angles of the enclosures were approximated and drawn out in the sketches. The enclosures' location in relation to other enclosures were also estimated. The sketches were then redrawn by hand according to scale.

Documentation of the enclosures and individuals included the following categories: animals (*identification, number, age, sex, origin, time kept at the Orphanage*), enclosure (*surrounding area, fencing, ground, vegetation, permanent and temporary interior, sleeping enclosure*), feed (*type, shape, supplements, frequency, feeding time, quantity, how it was given, origin*), enrichments, behaviour, improvements. For more detailes, see the inventorial checklist in Appendix 1. Information about the individuals was initially collected from the information boards by the enclosure. Further and additional information was gathered from the working staff. Employees were interviewed regarding the animals they had the most knowledge of. Often, more than one person had to be questioned regarding the same animal or topic. Some of the information was also gathered from an animal record in excel format. None of the three sources of information were sufficient by themselves and therefore it had to be compared and combined.

No ethological studies were carried out regarding the behaviour of animals. All the behaviours presented in the results are based on personal notes from occasional observations. Staff was also questioned in this matter. Short video recordings were taken when behaviours or events of special interests occurred.

2.3. Nursery, orphans and releasing

In order to make the inventory and to document the nursery´s procedures and rehabilitation of orphans, and to find out to which extent animals are released back to the nature, information was foremost gathered through interviews with the ground staff and management as well as through pictures and sketches.

3. Results

3.1. Congo Grey African parrots

At the Orphanage there are two Congo Grey African parrots. The parrots are sharing enclosure with one crested crane (*Balearica regulorum*), two vulturine guinea fowl (*Acryllium vulturinum*) and one helmeted guinea fowl (*Numida meleagris*).

The information about these two parrots is very limited and there is no detailed knowledge about their origin, neither is there any record kept over the birds. According to the staff the parrots are believed to have been at the AO for at least 15 years but their age and sex is unknown. However, many parrots that arrived to the AO during the past years were confiscated from smugglers and private persons, who have kept them as pets. It is likely that he remaining two parrot have the same history.

Figure 4. The parrot enclosure.
(Photo: Diana Sommer)

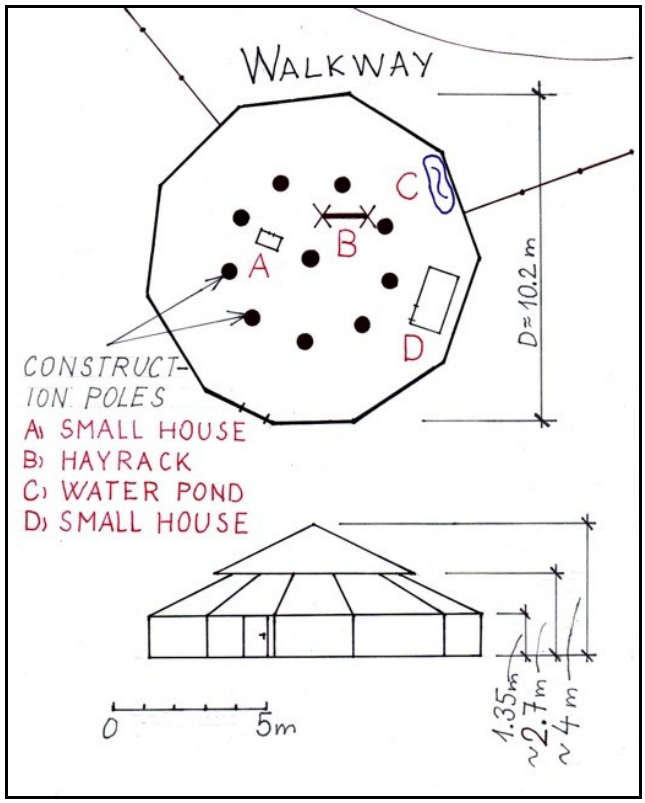


Figure 5. Sketch over the parrot enclosure.

The enclosure is round shaped; with an area of around 85 m^2 (see fig. 4 and fig. 5). The major part is located inside the duikers' enclosure, whereas the rest of the enclosure faces the walkway. This part does not have a safety barrier. The sides are made out of metal poles and strong wire mesh and wire netting. Visitors have full view of the entire enclosure crouching down, since the lowest point of the roof is only 1,35 m high. The cone shaped roof is consisting of wire netting with a rooftop covered with dry grass providing plenty of shade in the middle of the enclosure. There are also large trees outside the enclosure providing more shade during some parts of the day. Inside there is no vegetation and the ground is covered with red dirt with random spots of hay. The interior consists of two small wooden houses, a concrete water pond, a hayrack and a wooden log used for sitting, and plenty of poles holding up the roof construction.

The parrots seem to be very used to people and usually comes up to visitors if they stay long enough. They sing and whistle a lot in the morning and evening and they are as well responding to human whistling. According to the staff they are able to speak some words, which might indicate that they have had frequent contact or the possibility to hear humans speak during some time, and might have been someone's pet before they were placed at the AO. The staff is not socialising with the birds except for when they are fed, and then it is just very briefly. No allo-grooming or affectionate behaviour between the two individuals has been observed.

Different vegetables and fruits are served to all of the birds in this enclosure; green maize, papaya, papaya seeds, bananas, green

leaves (*kales*) and about 1.5 dl mix of natural peanuts and sunflower seeds. The total weight of the vegetables and fruits is about half a kilo, and it is given daily.

3.2. Cheetahs

Currently there are eleven cheetahs, eight females and three males, in five different enclosures at the AO. All of the cheetahs came to the AO from different places in Kenya after having been orphaned. Some of them are siblings or have been put together at early ages, and therefore some of them are kept in groups of three. In two of the enclosures, where they are kept in groups, their sexes are mixed, one male and two females. Two of the cheetahs are kept individually. The cheetahs' ages ranges from six months to six years and at the time of arrival they were from one to five months old. They are more or less tame since everyone of them is hand reared. However, the cheetah that arrived at five months of age is still quite shy and tentative. The staff is working on getting her tamer and accustomed to people (see fig. 22).

Figure 6. The smallest cheetah enclosure. (Photo: Diana Sommer)

The enclosures are ranging in size from about 120 m^2 to 350 m^2 and are all made out of two inch wire mesh and wooden or metal poles, all of them grounded. Some of the enclosures have wire mesh roofing while others only have wire mesh overhang. Neighbouring animals to the cheetah enclosures are duikers, monkeys, lions and hyenas. There is walkway on just one or two sides of the cheetah enclosures but there is still a complete view over all of the enclosures and no place for the cheetahs to get out of sight from the visitors.

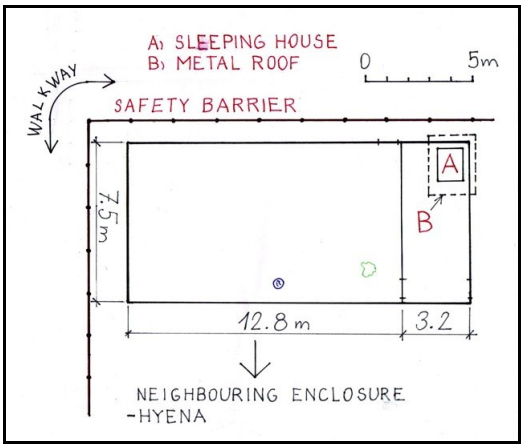
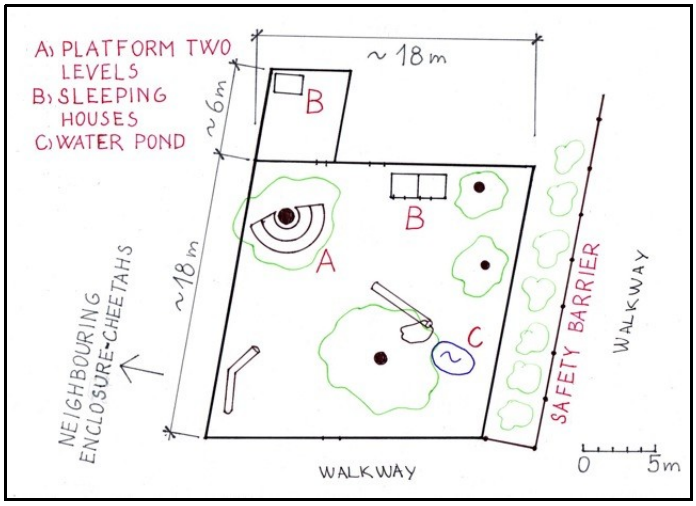


Figure 7. Sketch over the smallest cheetah enclosure.

All of the enclosures are covered in red dirt but a few of them have spots with low or tall grass. Trees are present in almost every enclosure except for in the smallest enclosure. In this enclosure there is therefore not much shade during the day (see fig. 6 and 7).

In each enclosure there are small wooden houses where most of the cheetahs are kept during the night, one of the groups is only locked inside the smaller wire mesh enclosure during night time. The dimensions of the houses differ a little in size but are in general not very large, in average 1.5 x 1.5 x 1.3 cm (2.93 m^3), (see fig. 10). The cheetahs are enclosed around 6 p.m. and let out around 8 a.m.

There are platforms in four of the five enclosures (see fig. 9). Other common interior in the enclosures are logs placed on a wooden stump and piles of rocks. Concrete water ponds are present in three enclosures while the two other enclosures have plastic or metal bowls as water source. These do not seem to be sufficient since they are easily tilted and emptied on water.



levelled platform.

Figure 9. The two levelled platform.
(Photo: Diana Sommer)

Figure 10. A sleeping house for cheetahs.
(Photo: Diana Sommer)

Safety barriers of the enclosures are provided by, in average, 100 cm high wire mesh and wooden rails. One of the enclosures has one side without such barrier which enables the visitors to have free access to touch the animals if they are lying close to the fence.

The cheetahs seem to use the platforms mostly when they are fed since their food is placed upon them (see fig. 18). However one of the enclosures has a larger platform, elevated in two different levels, they appear to use this platform frequently for resting, playing or observing their surroundings (see fig. 9). The logs on wooden stumps were never observed being used by the cheetahs. The younger cheetahs kept in groups are quite active as they play a great deal together, while the ones kept individually do not have the same possibility. However both of them are curious on their surroundings and on visitors. The adult cheetahs are observed pacing mostly before feeding but also on other occasions during the day, and appear at times quite restless. Most of the cheetahs seem to enjoy being patted, and stroke themselves against the wire mesh so humans can rub them. In general the cheetahs are spending lots of time resting in the shade, mostly during the warmest hours of the day.

As enrichment, exercise and to maintain the cheetahs tame, some of the cheetahs are occasionally taken outside their enclosures in leaches for walks around the AO, they are also played with using a toy on a string a few times a week (see fig. 21). The animals are also interacting directly with the visitors as they quite often are allowed inside the enclosures to pat the cheetahs. The AO is also offering the possibility for private persons to rent one of the cheetahs for special events like weddings or suchlike.

Cleaning of the enclosures is carried out every day; faeces are removed, the ground is raked and the water ponds are emptied and cleaned before filled with clean water.

The six year old cheetahs are fed around 1-2 kg of beef (meat on bone) (see

fig. 18) or are at times given rabbit instead. The two year olds are fed with about 2-3 kg of beef (meat on bone). The cheetah that are around one year old is given a little bit less than 2 kg of beef (meat on bone). The above mentioned cheetahs are fed once a day except on Mondays. The youngest ones that are about eight months old are fed 250 grams pieces of beef, rabbit or chicken twice a day. All of the cheetahs are additionally getting bone meal to every meal. The food is placed on the platforms or on the ground. There is a little bit of bickering about the food in the enclosures that holds groups, but nothing serious.

3.3. The nursery and handling of orphans

3.3.1. The nursery area

Orphaned and sick animals are taken care of at the nursery. The nursery area is located just behind some of the lion enclosures. The rail around the nursery is connecting with the safety barrier around the lion, hyena and cheetah enclosures, creating quite a large area that includes some of these enclosures. In the area there are two paddocks. They are located just next to each other and have a sun and wind shelter with concrete flooring inside. There is as well a small pen that is in a very poor condition and two houses in the nursery area (see fig. 11). Inside one of the houses, small boxes for the orphans are kept. The boxes are made out of wood with metal gratings on the top and their average size are 185 x 115 x 120 cm (see fig. 12). When an animal is kept inside, the inside is covered with straw. In the same house the milk and meat are prepared, and pellets and tools are stored.

Figure 11. The small pen at the nursery.
(Photo: Diana Sommer)

Figure 12. Box where young animals are kept.
(Photo: Diana Sommer)

The nursery area is in fact used for many purposes (see fig.13). In the other house there is an office but it is also functioning as a living quarters for the staff. Behind the houses there is a lot of garbage such as old wire mesh, poles, wood etc. disseminated on the ground and the area is functioning like a garbage lot. Further on, it is also used as a resting area for the staff. There is as well another building where rabbits are bred on the area.

Just outside the border of AO, next to the nursery area there is a large building, which serves as living quarters for the rangers and other staff at the KWS. A few times a week loud music is played and is heard all over the AO.

Figure 13. Young buffaloes grazing at the nursery area.
(Photo: Ellen Hedman)

3.3.2. The orphans

Currently there are one kudu, one bushbuck (see fig. 15), one Thomson gazelle and three buffaloes (See fig. 13 and 14) kept at the nursery. *Miracle* (see fig. 16), one of the cheetah cubs was in the beginning kept in one of the nursery boxes and was at times brought outside in a small transportable cage (see fig. 16). Miracle was transferred from the nursery to a larger enclosure during the time the inventory was performed.

The Thomson gazelle and the youngest buffalo are still getting milk from a bottle twice a day, but they were at the end of the inventory starting to nibble at the grass. The unweaned ungulates are provided with a little bit of hay, cow-calf pellets, lucerne and wheat bran once a day (if they have it in stock), but are otherwise fed through what they can find, grazing around the area. The ungulates, except for the small Thomson, are roaming around the nursery area as they like. It is not unusual to see the buffaloes resting or grazing just next to the lion, hyena or cheetah enclosures. One of the buffaloes was once even observed lying with its back against a lions back with only wire mesh in between. Only the Thomson gazelle is at the moment kept in one of the small wooden boxes (see fig. 12) in the house during night. This is to protect it from getting hurt if it would get startled or from being taken by a predator. The other ungulates are put in the paddocks during night.

Figure 14. The youngest buffalo still unweaned.
(Photo: Diana Sommer)

Figure 15. The bushbuck and kudu grazing close to the lion enclosures.
(Photo: Ellen Hedman)

The unweaned buffalo (see fig. 14) is very habituated to people and follows them around, probably trying to get milk or to be patted. It performs a great deal of stereotypic behaviour in the form of tongue rolling. The other ungulates are a bit withdrawn, but don't seem to care too much about the people around.

Figure 16. Miracle in the transportable cage. (Photo: Diana Sommer)

Miracle the seven month old cheetah cub, arrived at AO five months of age, after being orphaned. Since there were not enough of enclosures at the time of her arrival, she spent her first month at the AO, at the nursery, in one of the small wooden boxes (see fig. 12). She was kept at the nursery for about one month before she was finally put in a larger enclosure. Almost every day during her time at the nursery she was taken outside in a small cage made out of metal bars, which was placed just outside the nursery house (see fig. 16). She is clearly not at ease with people yet, as she becomes very stressed and snarls towards people as soon as they come to close to the cage. Since she arrived to the AO at an older age than the other cheetahs, this is not a very strange phenomenon. However, the staff is working on taming her and at the end of the inventory she carefully started to play and to eat from the staffs' hands.

AO never rejects an injured or orphaned animal, whether it is a buffalo or a cheetah. It is their policy to take care of any animal in need of treatment, rehabilitation or a place to stay. When an orphan arrives to the nursery the first and main goal is to keep it alive. The animal is hand reared by a few members of the staff, day and night, if needed. All the orphans are getting heated cow milk or hot water mixed with milk replacement powder that is normally given to calves. The cheetahs get milk until three months of age. Standard procedure during the animals growth, foremost the carnivores, is to constantly play with them and pat them. This is performed to make the animals very tame and habituated to people, hence the possibility for visitors and staff being able to enter many of the adult cheetah enclosures today.

3.3.3. Current situation

The space at the AO is very limited and there are basically no more places or enclosures to put newly arrived animals in. It is already crowded as it is and it is becoming a serious problem. The most urgent problem is insufficient space for the large cats, as their number is growing every year. Currently, there are 11 cheetahs and 12 lions in different enclosures at the AO. All of them are hand reared and more or less habituated to people. Consequently, they have no experience or skills of hunting and killing. No effort of rehabilitating the animals back into the wild is made, as there is simply no knowledge or resources for this to be accomplished. However, some species like duikers, jackals and monkeys have been released back into Nairobi national parks, but without any post-release monitoring. To solve the problem with the shortage of enclosures, AO give animals away to private persons who desires to have wild animals on their property. Apparently, it is considered distinguished to have wild animals in your possession. Recently, three lion siblings, one male and two females, were given away to a private person to make an enclosure available for Miracle. A special request and an official authorisation from the chairman of KWS are required to be granted a wild animal for personal holding. KWS is before the official approval reviewing the enclosure the animals are to be kept in, but no follow up on the matter is carried out. In this case one major problem could be that none of the sibling lions were neutered, and once they reach a sexually mature age they might start to reproduce.

4. Discussion

4.1. Congo Grey African parrots at the Animal Orphanage

The current enclosure and management of the parrots today is unfortunately not ultimate in any way, but it could easily be altered to the better. The space inside enables limited possibilities of flying, as the roof is shaped as a cone with wire netting hanging from the sides down into the area, stealing free elevated air space (see fig. 4). Construction poles holding up the roof are also an obstruction in a free flying space. The parrots were observed to spend much time strolling around on the ground. In nature, this behaviour only occurs a few minutes a day while for example feeding on clay (Wright, 2001). The parrots at the AO are always fed on ground, hence the significant amount of time spent there. This is not necessarily a negative thing, as it might be an environmental enrichment and stimulation for the birds to forage for food on ground instead of having it neatly served in bowls. Although the enclosure is already fairly large, enough free airspace should nevertheless be a mandatory requirement especially considering that the parrots most likely are to stay there for the rest of their lives. Birds in nature are at times moving several kilometres every day in search of food and a place to roost (Wright, 2001). Not to have the opportunity to fly at any greater extent is a very unnatural state for a flying bird. As with humans, exercise helps keep the musculature fit and thus contribute to a better health. An enlargement and reconstruction of the enclosure are therefore a strong recommendation.

Inside the enclosure there are no interior facilities providing opportunities to climb, except for the wire net, which was often observed to be used for this purpose (see fig. 17). A stationary climbing tree, which can be supplied with fresh branches a few times a week, would provide an opportunity to climb as well as diversity in their environment. Branches with leaves will also in itself act as an environmental enrichment as the parrots would be able to gall on the bark and leaves

Figure 17. The two parrots using the enclosure for climbing.
(Photo: Diana Sommer)

In the enclosure there are no proper sitting sticks for the birds to sit on; they are able to sit on the hayrack as well as the rooftops of the small houses inside the enclosure. This problem could easily be fixed with just adding different sized sticks from nature into the enclosure. Some of the sticks should then be placed at an elevated level as the parrots prefer to roost in high tops of trees (Wright, 2001). No highly elevated sitting places exist in the enclosure today.

Unfortunately not much attention was given to these birds and no environmental enrichment or other stimulation was added at all. Congo grey parrots are as many other parrots very intelligent animals and require some kind of mental stimulation when kept in captivity, as they otherwise easily are bored and tend to develop psychological disorders such as feather picking (Levine, 2003). Toys and food enrichments or such should be added and varied, a few times a week as it may have a substantial impact on the birds welfare (Luesher, 2006). However it is positive that the birds are kept in pairs, as they indeed are flock animals and very easily get stressed while kept alone (Luesher, 2006). There is nevertheless no indication that the two birds are a bonded pair. They were never observed to sit next to each other or groom each other, which are both indicators of a close bond between parrot individuals (Luesher, 2006).

The birds were given whatever fruit and vegetables that were available for the season. It is positive that the diet is mainly consisting of fruit and vegetables and not seeds only. However, a more thorough check, on what is given and what is required for these birds should be performed. For instance the green leaves they called kales resembles spinach. Spinach contains lots of oxalacid,

it is likely that kales do to. Oxalacid blocks the absorption of calcium in the body and should therefore be served sparingly (Wright, 2001). A balanced diet should consist of 50 percent of vegetables, 20 percent of grains/beans, 10 percent of seeds/nuts and 5 percent of greens (Wright, 2001). One of the most common deficiencies found in pet Greys parrots is vitamin A. It is important to provide vitamin A daily, hence should the type of vegetables and fruits that are served be thoroughly calculated. Preferably parrot pellets should be served ad libitum as basic food while fruit, vegetables, nuts and seeds should be served additionally. However pellets may be a difficult product for the orphanage to get hold of.

4.2. Cheetahs at the Animal Orphanage

The cheetah enclosures at the AO is far from satisfactory considering size and complexity, some worse than others. Despite the condition of the enclosures the younger cheetahs did not seem to display much pacing or other stereotypic behaviours. This behaviour was, on the other hand, much more common in the older cheetahs. In a study by McDougall et al. (2006) it has been observed that the longer time animals spend in captivity the higher degree of stereotypic behaviour will occur. It is therefore not unlikely that with time, this behaviour will develop in the younger cheetahs as well and increase with the older cheetahs. Measurements should urgently be taken to prevent this from happening.

Cheetahs range over large areas in the wild and according to a study conducted by Clubb & Mason (2003) there is a positive correlation between home range size and pacing. This speaks for that the larger area the animal is moving on in the wild the more stereotypic behaviour in the form of pacing occurs in captivity. To greatly enlarge the enclosures and make them more diverse would be the most important step in the improvement of the cheetahs welfare. Since the AO is located in close proximity to the Nairobi National Park, there are great possibilities to extend the AO area in this direction. If this was to be realised, it would be recommendable to use the natural vegetation of the area better i.e. to keep more trees and bushes which would provide an opportunity for the animals to hide or withdraw from the visitors. It should also be a priority to provide the cheetahs with plenty of elevated areas, where they can observe their surroundings better, and thereby feel as they are in greater control (Newberry, 1995) and consequently less stressed.

Figure 18. Cheetah feeding on a piece of beef. (Photo: Ellen Hedman)

In nature animals are spending much time actively searching for food, but the abundance and presence of prey may vary. Carnivores range sometimes over very large areas to track, hunt, kill and feed, all of which steps requires a great deal of time and energy. In contrast, the possibilities for carnivores in captivity to express the same hunting and feeding behaviours are very limited. At the AO, as well as in many other zoos, the cheetahs are fed a cut piece of meat, nothing that even remotely resembles a whole carcass. They are further fed on a regular basis, every day in some cases. When they are still young, it might be a necessity which enable to keep them fit and healthy, but as they grow older a more irregular feeding schedule would be preferable, in order to allow a more natural feeding rhythm and also to keep up the interest for the served food. It is further important to consider factors like diet consistency, variability, temperature, how it tastes and how long it takes to eat (Bond & Lindburg, 1990). Despite the fact that stereotypic behaviour are foremost connected to range´s size, ahead of foraging (Clubb & Mason, 2003), food enrichment should be integrated in the AO management. Enrichment have proven to have a positive effect reducing or preventing this kind of behaviour and can to some extent provide opportunities for promoting naturalistic feeding behaviour (Bashaw et al., 2003).

Enrichments such as bones, frozen fish and different scents reduce the time large felines spend pacing and is further raising the activity level in animals (Bashaw et al., 2003; Skibiel et al., 2007). Feeding enrichments such as popsicles containing food has likewise been proven to enhance the animals activity; increased standing, sniffing, movement, gnawing and licking (Powell, 1995). As well as hidden meals that produced increased locomotion and exploring behaviour in a study with leopard (Shepherdson et al., 1993). Recorded sounds from prey has also demonstrated a increased activity level has as well as a decreased stereotypic behaviour (Markowitz et al., 1995) . Simple measurements such as these may have a beneficial impact on the feline behaviour and welfare consequently enhancing the animals wellfare, accordingly an enrichment programme should be established at the AO. One very important requirement of a successful behavioural enrichment programme is to have sufficient resources in terms of staff and financing. The staff should be dedicated and committed to providing the animals an improved welfare and not just with the aim of meeting minimal demands (Markowitz & LaFors, 1987). At the AO, there are plenty of resources in terms of staff and furthermore a desire of improving the life quality for the animals, which is a good start. AO would need to restructure and prioritise differently as well as obtain financial resources and know-how. Further, there are a few features that have been identified as important in good enrichment devices in carnivores that can be considered, when developing an enrichment programme, e.g. to promote the novelty of the enrichment object and remove it as soon as it is not in use, to use a moving artificial prey, to use sound as stimuli, as it seems that sound helps to retain the animals interest for a longer time (Markowitz & LaFors, 1987).

Since the inventory did not include a more thorough review of the health status of the cheetahs a detailed evaluation of this matter are restricted. A few general things can nevertheless be said about their health status, based on how well their dietary requirements are met at the AO. At first sight, they may appear as healthy cheetahs, but if the diet is insufficient, there is a great risk of deficiency deceases both now and in the future. The older cheetahs are normally fed with one piece of beef (meat on bone) and some bone meal which may be insufficient enough to cover their dietary needs. A study performed by Schultheiss et al. (1998) on how the cheetahs dietary needs were met when fed on lean beef supplemented with vitamins, minerals and fatty acids, showed deficiencies of vitamin A, E, B2, niacin, taurine and fatty acids like omega 3 and 6. Deficiencies that may cause diseases like nervous symptoms such as ataxi, muscle weakness, poor hair coat, poor vision, flaws in the immune system and may thereby affect the cheetahs physical and psychological heath considerably. If these symptoms occur in the cheetahs at the AO are not clear, a thorough medical examination of the cheetahs would be required, to determine any deficiencies in order to decide the accuracy of the current diet. Feeding with meat on bone and, at times whole carcass of rabbit and chickens are, however, an advantage in the AO feeding plan. Carcass feeding is promoting a good dental health as well as bringing positive psychological effects (Bond & Lindburg, 1990), it further resembles how they feed in the wild.

One last remark on the cheetah handling will be made on the possibility to rent a cheetah for events like weddings or such. Although money is always an issue, this should not be carried out for any reason. KWS´s goal is to teach people about the Kenyan wildlife, to enable more understanding for these animals and hence protect Kenyan wildlife. The presentation of a cheetah as a pet and entertainment object does not promote any such kind of knowledge and understanding. Also from a conservation point of view it is reprehensible and should be stopped immediately.

4.3. Rehabilitation and releasing

Zoos are today playing a more important role than solely exhibiting animals for entertainment. Many zoos are now days playing an important roll in the conservation work with different species. The AO does not describe itself as a zoo but as a sanctuary for orphans and sick animals; their foremost activity today is nevertheless to exhibit the animals for educational purpose. Although one of the AOs objectives is to reintroduce animals when it is possible, they have no orientation towards this kind of activity at all. Perhaps AO should take a greater part in the conservation work and at the same time solve the acute problem with a congested facility. They could create a facility which has

a greater purpose than simply keeping animals without any future plans, an establishment which rehabilitates and prepares animals for a life in nature again, with the main purpose of releasing them back. Education about animals is naturally also an important part in the conservation work. The KWS does, however, already have the Safari walk for this purpose and as this facility exhibits animals in a more natural environment in slightly better enclosures, it might even serve as a better education object. Suppose AO would like to retain the educational part and this source of income, one section could remain open for visitors, while the major section could be secluded and focused on rehabilitating animals for a future release.

To run a rehabilitation and release program requires knowledge, funds and other resources (Kleinman, 1989). AO would probably benefit from obtaining knowledge and experience from contacts with similar projects around in Africa and it would be an important step in a possible reformation of the AO. Knowledge about the species ecology, behaviour and life-history strategy are also essential, without it, a successful release is unlikely (Caro, 1999; Wallace, 2000) and reintroduction can only be a functional tool if behaviours essential for survival in the wild are maintained in captivity (Rabin, 2003).

To commence this kind of facility AO would also have to implement a major restructuring regarding management and construction of the facility. It would also be advisable to acquire long term and reliable sponsors, as research has shown that projects with the highest success extended over many years (Beck, 1994). Today the enclosures at the AO are neither satisfactory in an animal welfare perspective nor in the context of a conservation aspect. The environment that the animals are kept in at the AO is unnatural regarding to how animals live in the wild; the enclosures are small, they are without any complexity and the contact with humans is immense.

As a consequence of a life in captivity animals may have decreased capabilities to survive, since they may lack correct behaviours in the wild (Rabin, 2003). It is therefore essential for animals that are to be released, that the captive environment is as naturalistic as possible and that it enables the animals to perform natural behaviours to the most achievable extent (Vickery & Mason, 2003). The behavioural consideration is probably the most important part regarding release of captive animals. The animal require several skills for having a chance of coping in the wild e.g. hunting or foraging skills, an ability to choose a suitable place to rest and sleep, to display the correct behaviour with other species and predators. Further, they need the capacity to establish relationships with conspecifics regarding competitive and co-operative activities such as finding a mate, rearing of offspring and developing of alliances (Box, 1991). Other problems that occurs in many captive individuals is that they don't know how to move around freely in natural vegetation and might even get lost. This is due to the fact that captive environments are not sufficient enough in their size and in their complexity (Box, 1991). Rearing and husbandry in captivity must be well thought through so that it does not conflict with the behavioural needs required in nature (Wallace, 2000).

Various animals were observed performing stereotypic behaviour at the AO. Environmental enrichments have proven to be useful when it comes to reducing these behaviours and alleviate boredom, especially if introduced early in the life (Callard et al., 2000; Rabin, 2003). It may even encourage animals to express species-typical behaviours (Rabin, 2003). To prevent stereotypes is particularly important in animals that are to be released. In a study made on bears it was found that animals performing stereotypes were unfit for reintroduction in the wild due to that their behavioural flexibility was restricted. Flexibility is thought to be an important ability for survival especially during the fist time after release since the animals need flexibility to be able to adapt to new demands in the wild (Vickery & Mason, 2003). Accordingly, it is of the highest importance, that the facilities are looked over and altered. Improvements such as increased size and higher degree of complexity in the enclosures, environmental enrichments and other measurements that prevent stereotypes and improve the animals' welfare should be implemented. It has further been found in a study that older individuals with longer time spent in captivity, performs more stereotypic behaviour than others (Vickery & Mason, 2003), consequently it should be a priority to release animals after as short time at the AO as possible.

Although the environmental enrichments can generate positive effects, animals might not know in which context to perform it (Rabin, 2003). Environmental enrichments are thus most likely insufficient to teach the captive animals several natural behaviours that are required in nature for survival, e.g. hanging meat on a swinging pole, does most likely not teach the animals how to stalk, hunt, capture and kill a live prey in the wild (Rabin, 2003). However, in some cases, environmental improvements for some species can include more specific training to improve foraging or predatory skills and/or predatory avoidance (Wallace, 2000). A program that preserves natural animal behaviour in the right context is thus required. The programmes should involve abilities such as learning of motor actions, hunting, reaction to predators, and mate choice (Rabin, 2003). Environmental challenges are crucial to stimulate natural patterns of behaviour (Box, 1991). Training is a key word as it entails specific environmental manipulations that can aid the development of social as well as physical skills. Training may take place before release either in captivity and/or at the actual release site (Box, 1991). However, natural behaviour management should not be postponed until the time just before release, but should be attended to regularly throughout all of the animals' time in captivity. The animals need to be subjected to the appropriate surroundings and the right stimuli for such behaviours to develop. This way will most likely reduce the need of pre-release training and increase the survival of the reintroduced animals (Rabin, 2003)

Predation and *anti* predation behaviour is usually socially transmitted and thereby needs to be taught (Rabin, 2003).

The animals need to learn about the predator´s features, for recognition but also so that the animals do not respond to non-predators (Griffin et al., 2000). It is possible for animals to be taught or conditioned to avoid dangers, in captivity (Wallace, 2000). According to Griffin et al. (2000), there are several ways to teach anti predator behaviour, his suggestions will be described in the following text. Social anti predator learning may be very effective in some species, especially in social living species or species with a prolonged parental care. This might be hard to implement as it requires an experienced individual that can act as a model. To expose the animals to live predators provides a stronger stimulus, but it is also difficult to implement and it might further constitute many risks, such as attacks and less control over the stimuli. Training to recognise and avoid predators can also be accomplished with the help of model predator. This training also offers much more control over the stimuli. A fourth, but not as efficient way, is to train anti predator behaviour with unconditioned stimuli that instead elicitates fear, unpleasantness or pain, with the help of for example water squirts, loud noises or such. Griffin et al. (2000) further argues that anti predator response must be functioning already the very first time the animal encounters a predator, the response may, however, improve with experience. Only one or two encounters are required, since by nature, it would be maladaptive for it to require many experiences. Griffin et al. (2000) further stress, that it is of great importance that the predators have to be offered with a variation in the presentation methods to avoid habituation to the predators or stimuli. The free ranging herbivores at the AO, would accordingly not be suitable for a release in the wild since they are extremely habituated and accustomed to predators i.e. they are resting, as well as grazing in close proximity to the predators' enclosures (see fig. 19 and 20). Neither would probably other animals kept in enclosures be, since all of them, more or less, are accustomed to the predators either by hearing them, by sight or smell. For these animals to be fit for a release, they should have been secluded and kept out of sight from the predators from day one at the AO.

Figure 19 Buffalo grazing next to a lion enclosure. (Photo: Diana Sommer)

Figure 20. The kudu grazing next to the cheetah's cage. (Photo: Diana Sommer)

Concerning predator behaviour, the best way to promote this behaviour, is to expose the captive animals to the appropriate prey in the area where the animal are planned to be released, but it might even be necessary, to expose the prey species already in captivity (Rabin, 2003). At the moment the AO are feeding all of the carnivores with pieces of beef. However, in case of a possible release, it would probably be adequate to feed them with whole carcasses of the species they naturally feed on, for them to get accustomed to what prey they should pursue once released. To feed the animals with domestic animals could constitute a risk, as once released, they might prey upon domestic cattle instead of wild prey (Rabin, 2003). A soft release as mentioned before is to prefer. For example gradually reduce the amount of food (Sinclair, 1995), or/and give the animals food more irregularly, as it was done in the reintroduction of red wolfs (Wallace, 2000), both of which examples give the carnivores an opportunity to adapt to demands in the wild. AO is feeding the carnivores six times a week regularly, which is most inadequate in a natural feeding rhythm aspect. In this case they must change their routines and feed the carnivores with a method more similar to how the animals feed in the wild. It might further be a good idea to also choose an area, which enables a soft release. A large but enclosed area where the appropriate preys are abundant, could offer an excellent opportunity for naive animals to practise their hunting and killing skills.

There is always a risk that the released animal will infect the wild populations with pathogens to which they lack resistance. The risk for this is highest, when the animals originate from multi-species facilities. Precautions, like isolated facilities and separate staff for these animals, are examples of safety measures that can be taken (Snyder et al., 1996). A different location and facility for the potential release animals might thereby be to recommend. They should further undergo a thorough medical investigation before being released.

It is also of great importance that the chosen area of release is appropriate. It should have a suitable territory and a prey base sufficient enough to support a self-sustaining population of the released animal (Moore & Smith, 1991). There are also territorial considerations that should be reflected on, as they may affect chances of survival, e.g. when predators like lions and hyenas are present in the area, reintroduction of the cheetah is less successful (Hayward, 2007). Which is why, it would in the case of a release of a cheetah be adequate, to choose an area less dense on hyenas and lions. It is further important, that the local people in the area are carefully informed and if possible even somehow involved in the project, since acceptance of local people is vital for the success of endangered species restoration projects (Moore & Smith, 1991). From all of the deaths of cheetahs, in a study conducted in Namibia by Marker et al. (2003), humans were responsible for 53% (males) and 62% (females). Only 38% respectively 25% of the cheetahs died of natural causes, the rest of the deaths were unknown. Research has shown that the projects with the highest success involved the local people through employment opportunities and education (Beck, 1994). Humans do naturally not welcome animals that are killing their livestock or constitute a danger for people. If animals such as lions, cheetahs or hyenas do not hold a natural fear for humans, they will most likely end up in a conflict with humans sooner or later. The rehabilitation program should

consequently aim to make the animals stay away from humans once released. In a reintroduction performed with red wolf, human contact was minimised and no friendly relationships between humans and animals were allowed (Moore & Smith, 1991). AO would in this matter have to do major modifications in their handling of the carnivore, as they today aim to make them as tame as possible (see fig. 21 and 22).

Figure 21. Staff walking with a cheetah on a leash. (Photo:Diana Sommer)

Figure 22. Staff playing with a cheetah cub to make it tame and for exercise
(Photo: Diana Sommer)

Future rehabilitation and release programme details about handling of animals, must be further investigated and co-operation with similar projects would be strongly recommended. It will require much commitment from many parts of the KWS, lots of resources, knowledge and collaborations. It is likely that appropriate areas that could be used for releasing animals are nature reserves and not the complete wilderness, as they would be more protected there. As projects like these are so demanding, it might be an option, to initially focus on only one or a few species. The cheetahs might be a suitable target species to start with, for a few reasons. They are greatly overpopulated at the AO, they are carnivores that range over large areas in nature and thereby doesn't cope very well in captivity (Clubb & Mason, 2003), they are experiencing chronic stress in captivity (Terio et al., 2004) as well as they are considered vulnerable by the IUCN. The many natural reserves that are found throughout Kenya could be appropriate habitats for releasing. The suitability of these areas would, however, require more investigation before any action is taken. However the fact that carnivores are harder to rehabilitate should also be included in an evaluation when choosing species to start with.

5. Conclusions

The inventory has revealed an urgent need of knowledge and change at the Nairobi Animal Orphanage. Modifications of enclosures and management as well as a future planning are clearly required, for the facility to meet the objectives of a high standard rehabilitation project with a satisfactory animal welfare, as well as a proper educational centre of Kenyan wildlife. Every cheetah enclosure and the animal management are in the need of improvements. The enclosures are insufficiently large with a poor interior and no environmental enrichments are carried out. The parrot enclosure enables little possibility of flying, and offers very little physical as well as psychological stimulation for the parrots. Simple measures such as food enrichments or new enclosure interior could easily be implemented for both of the species, enabling improved animal welfare. Larger and more complicated alterations may require greater funds and knowledge acquired externally e.g. from Skansen.

New animals keep arriving and there are no future plan of what to do with them when they recover or grow up, as a result, the facility is completely overloaded. To make the project sustainable, advance planning needs to be applied. Today, AO is foremost operating as a zoo

facility, although it has not originally been design as one, hence the poorly designed and unplanned enclosures. If rehabilitation and releasing of animals back to their natural habitat would take a greater part in the project, it would not only provide the facility with more space and free enclosures, but may also make a contribution to the conservation of the species. Although it already is an aim of the AO there are simply no knowledge nor resources for this aim to be a reality. The rehabilitation project should strive towards being a long term project and would further require the engagement and involvement of several additional organisations in excess of Skansen. Economical funds from different sponsors will be essential, Co-operation with Skansen and other relevant organisations will hopefully provide the opportunities and skills enabling AO to develop and reform the facility, resulting in future improvements and changes.

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Appendix 1.

Inventorial checklist

SPECIES:
IN CHARGE:

A) Animals
1. Identification
2. Number and ages of:
   - females
   - males
   - young
3. Origin
4. Time in Orph
5. State of health
   - before/after arrival
   - medical treatment
6. Future plan for individuals
   - reintroduction (when, where)
   - staying
   - reasons

B) Enclosure
1. Surrounding area (neighbouring species, walks, etc.)
2. Lengths of sides open to visitors and hotspots.
3. Size and shape
   - displayed, back, outside, inside - gates (location, sizes, locks, sluices, security)
   - placement in relation to the sun
   - spotlights (during night)
4. Fence
   - material
   - height
   - design
   - grounding
   - security
5. Ground
   - material
   - topography
   - sand pits
   - water ponds
6. Vegetation
   - type and size
   - numbers
   - species
7. Permanent interior (size and material)
   - protection (wind, sun, rain, visitors)
   - platforms (natural and artificial)
   - feeding devices (mobile, permanent)
   - water troughs (mobile, permanent)
8. Temporary and mobile interior
   - material
   - design
9. Small Enclosure (SE)
10. Risk assessment
11. Area per animal

C) Feed
1. Type and shape
2. Supplements
3. Frequency
4. Time of day
5. Quantity
6. How it is given
7. Placement in enclosure
8. Origin
9. Storage and handling of
10. Adjustments
    - species
    - individuals
11. Quality
12. Sources

D) Enrichment
1. Type and material
2. Purpose
3. Use
4. Risks
5. Frequency
6. Permanent

E) Behaviour
1. Lack of species specific behaviours
2. Social organization
3. Stereotypes
4. Activities (use of days/nights)
5. Use of enclosure and interior
6. Sharing of space
7. Aggression and dominance
8. Tame individuals
9. Stress from visitors or other sources

F.) Routines
1. Supervision of animals
   - good/bad overview
   - frequency
   - what is observed
2. Cleaning
   - ground, interiors, facilities, etc.
   - frequency
   - method
   - manure handling
   - equipment
3. Journal keeping
4. Handling of individuals
   - educational purposes
   - methods of capture
   - preparations and purposes with handling (reintroduction, taming)
   - handling of orphans or injured animals
5. Rotation of species in different enclosures
6. Staff (same persons doing different things)

G) Health assessment
1. Parasites
   - pressure
   - species
   - abundance
   - checks and control
   - deworming
2. Vaccination
3. Veterinary routine controls
4. Health journal

H) Ground staff
1. Problems
   - enclosures
   - handling (animals, feeding, cleaning)
   - visitors
2. Ideas and suggestions for improvements
3. Background, education, time at Orph.
4. Management

I) Visitors
1. Behaviour of
2. Type
   - age
   - locals/tourists
   - education/leisure

J) Improvements
1. Feed and water
2. Enrichments